

PROJECT FINAL REPORT

HAMMOND POND STORMWATER MANAGEMENT PLAN

Project Number 02-08/319

Dates: 2003 – 2007

**CITY OF NEWTON
CONSERVATION COMMISSION AND
DEPARTMENT OF PUBLIC WORKS**

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PREPARED FOR:

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF RESOURCE PROTECTION

AND

US ENVIRONMENTAL PROTECTION AGENCY
REGION 1

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A. Project Snapshot

Project Number and Title: Hammond Pond Stormwater Management Plan – 02-08/319

- A1. Project start date: June 2003
- A2. Date closed: July 2007
- A3. Basin and HUC 12 subwatershed: - Charles River – Cheesecake Brook to Boston (for Hammond Brook and Laundry Brook)
- Charles River – Rock Meadow Brook to Cheesecake Brook (for Saw Mill Brook)
- A4. Segment and/or waterbody number(s): MA72044_2004
- A5. Status of waterbody: Category 3 (No uses assessed)
- A6. Priority Pollutant(s) Targeted: Sediments, nutrients, metals, chloride and bacteria
(Pollutants Listed: Fecal coliform, metals, noxious aquatic plants, nuisance vegetation, nutrients, objectionable deposits, odor, oil & grease, PCBs, scum, sedimentation, taste, odor, color, toxicity, turbidity)
- A7. Estimated Annual Pollutant removal (**total for all BMPs**, which are all located within the same drainage area/basin):
Nitrogen (N): 24.2 lbs/year
Phosphorus (P): 4.3 lbs/year
Sediment: 1.0 tons/year
Bacteria: not provided in output of STEPL algorithm program
Other (BOD₅): 20.3 lbs/year
Method of Determination: US EPA's Spreadsheet Tool for the Estimation of Pollutant Load (STEPL, Version 4.0)
- A8. BMPs installed, number and type:
1. A series of bio-retention facilities (5) with catch basins and inlet swales from the parking lot and driveways, and outlets into the pond. Upon construction completion and installation of the plants and shrubs, each area was staked and taped off (temporarily) to ward off the waterfowl from eating the young plants. This can be seen in several of the photographs.
 2. Two (2) Perimeter sand filters installed in a parking lot that is used for snow storage by the shopping center every winter.

Non-structural BMPs

3. Planting areas/buffer areas (2) to provide wildlife habitat and lessen the amount of grass cover to limit the food sources available to Canada geese and other waterfowl.
4. Routine parking lot street sweeping with added heavy duty sweeping / cleaning in early spring for the snow storage area of parking lot.

Good Housekeeping and Behavior Modification Measures:

5. Operation & Maintenance Plan including catch basin and sand filter cleaning, plus regular maintenance of the bio-retention areas and sweeping of the parking lot and driveways.
6. Educational outreach: Signage & Brochure re: Don't feed the waterfowl to attempt to lessen the number of waterfowl attracted to the pond. Postings and newspaper articles describing the bio-retention and planting areas and their function.

Descriptive Project Summary

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

SECTION 319 NPS PROJECT 02-08/319

PROJECT TITLE: Hammond Pond Stormwater Management Plan
NPS CATEGORY: Urban Runoff
INVESTIGATOR: City of Newton
LOCATION: Charles River Watershed
TARGETED POLLUTANTS: Sediments, nutrients, metals, chloride and bacteria.

DESCRIPTION:

Hammond Pond is a 22-acre freshwater kettle pond located in Newton within the Charles River Watershed. Its outlet is at the southerly end of the pond where Saw Mill Brook begins at the overflow spillway before flowing into Brookline, back into Newton and eventually through West Roxbury and into the Charles River. During periods of extremely high water, water will overflow into Hammond Brook on the wooded northerly side of the Hammond Pond. Hammond Brook discharges into Laundry Brook and ultimately into the Charles River. The main portion of the area surrounding the pond is heavily wooded public open space; however, approximately 38% of the watershed is commercially developed with shopping areas and associated parking lots, major feeder streets and Route 9, a Massachusetts Highway Department four-lane highway running through Brookline and Newton. In addition, numerous waterfowl have made Hammond Pond their home as a result of well-intentioned citizens who routinely feed them. The urban runoff generated from this commercially developed area has speeded up the eutrophication process as characterized by excessive aquatic vegetation, bacterial contamination and rapid infilling of the pond.

The Management Plan developed for Hammond Pond envisioned work in two phases. Phase 1, as reported here, includes bio-retention areas, sand filters, planting/buffer areas, pavement modifications and improved maintenance practices to cut down on the contributions of pollutants from the parking lots and driveways immediately adjacent to the pond. [The second phase envisions modifications to the Route 9 highway pipe which discharges directly into the pond as well as a Vortecnic unit to filter stormwater coming from the Chestnut Hill Mall roof and the Hammond Pond Parkway. Phase 2 has not yet been designed or funded.]

The objective of Phase 1 is to manage the first flush of stormwater from the parking lot and driveways with the BMPs noted above, as sized for the first half-inch of rain.

Project tasks included:

- Task 1: QAPP (requirement later rescinded by DEP)
- Task 2: Design, Permit and Construct BMPs (*ongoing)
- Task 3: Operations & Maintenance Plan. The City and the shopping center management have agreed on their responsibilities for ongoing maintenance.
- Task 4: Outreach and Education. DCR gave the City permission to place temporary signage on their kiosk. Additional signage regarding the construction process was erected.

Results:

PROJECT COST: \$385,000

PROJECT COMPLETE: July 24, 2007

DURATION: 2003 – 2007 (includes design to completion)

C1.Type of BMP: Bio-retention cells 1, 2 and 3

C2.Date of implementation: September and October 2006

C3. Size of treatment area: 720 square feet (SF), 1010 SF, and 600 SF, respectively

C4. Area land use: Urban – parking lot and driveway

C5. Pollutant load removed: not distinguishable per individual BMP. The STEPL pollutant load allocations are evaluated per subwatershed (drainage) area. Please refer to the table below for the for the nutrient / pollutant load removal with all BMPs implemented for this drainage area. See also the attached STEPL worksheets and graphs.

C6.Method of pollutant load removal determination: STEPL, Version 4.0

C7. Percentage of pollutant removed from the 12-digit HUC (for N, P, fecal coliform, and sediment only): With all the BMPs implemented in this drainage area the percentage reductions are as follows:

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- C8. Type of BMP: Bio-retention cells 4 and 5
- C9. Date of implementation: May-June 2007
- C10. Size of treatment area: Bio 4 = 2,500 SF and Bio 5 = 1,100 SF
- C11. Area land use: Urban – parking lot and driveway
- C12. Pollutant load removed: not distinguishable per individual BMP. The STEPL pollutant load allocations are evaluated per subwatershed (drainage) area. Please refer to the table in C7 for the for the total nutrient / pollutant load removal for the drainage area. See also the attached STEPL worksheets and graphs.
- C13. Method of pollutant load removal determination: STEPL, Version 4.0
- C14. Percentage of pollutant removed from the 12-digit HUC (for N, P, fecal coliform, and sediment only): Please refer to the table on page 5 under section C.7.
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- C15. Type of BMP: Planting Area #1
- C16. Date of implementation: October 2006
- C17. Size of treatment area: 1,450 SF
- C18. Area land use: Urban – adjacent to parking lot
- C19. Pollutant load removed: not distinguishable per individual BMP. Please refer to the table in C7 for the for the total nutrient / pollutant load removal for the drainage area. Although not easily calculated (or evaluated in the worksheets) it is anticipated that the planting areas will discourage year-round waterfowl nesting and breeding and thereby reduce bacteria impacts to the Pond.
- C20. Method of pollutant load removal determination: STEPL Version 4.0
- C21. Percentage of pollutant removed from the 12-digit HUC (for N, P, fecal coliform, and sediment only):
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- C22. Type of BMP: Planting Area #2
- C23. Date of implementation: May-June 2007
- C24. Size of treatment area: 744 SF
- C25. Area land use: Urban – adjacent to parking lot.
- C26. Pollutant load removed: not distinguishable per individual BMP. The STEPL pollutant load allocations are evaluated per subwatershed (drainage) area. Please refer to the table in C7 for the for the total nutrient / pollutant load removal for the drainage area.
- C27. Method of pollutant load removal determination: STEPL Version 4.0
- C28. Percentage of pollutant removed from the 12-digit HUC (for N, P, fecal coliform, and sediment only): The STEPL pollutant load allocations are evaluated per sub-basin (drainage) area. Please refer to the attached worksheets and graphs.

D. Lessons Learned

1. Construction cost estimates are good for about six months. After that time, major events may have occurred to make them obsolete. For example, after Hurricane Katrina and the rebuilding in the southern U.S., the cost of concrete and steel rebar quadrupled. As a result, the final costs of the construction and installation of the project sand filters cost over 3 times as much as the original estimate.

2. Volunteers are great in the beginning, especially at grant writing, fundraising and publicity, but it is somewhat difficult to sustain sufficient energy to do the physical work portions of the project such as planting large numbers of trees, bushes and plants on nice days when they would prefer to be in their own gardens or going on vacation. In addition, when your chief volunteer moves out of town, that historical knowledge and dedication cannot be replicated.
3. As staffing levels are reduced due to budget cutting in a municipality, the time available for project management is compressed and projects get behind quickly. In addition, the reporting requirements always take longer than you thought they would.
4. The costs are almost always more than you estimated them to be. Finding additional funding mid-project is extremely difficult, if not impossible.
5. As project costs increased, Newton's DPW role expanded to fill in these gaps and shortfalls. This presents new challenges when resources are stretched and DPW-related emergencies occur or other priorities take precedent.
6. Finding minority and/or women-owned construction companies can be challenging when the municipality's bonding and insurance requirements are onerous to small firms and/or the technology is somewhat advanced and/or the timeline is short.

E. Attachments

Attachment A: Maps: Watershed Map on USGS Topographic Map
Site Plan showing all BMPS

Attachment B: Construction Photographs 2006 and 2007

Attachment C: Record Plan and Engineer's Certification

Attachment D: Operations & Maintenance Plan

Attachment E: Brochure & Signage

Attachment F: STEPL Inputs, Data Outputs and Graphs

NOTE:

This project has been financed in part with funds from the Environmental Protection Agency (EPA) to the Massachusetts Department of Environmental Protection (the Department) under the s. 319 Non-point Source Competitive Grants Program. The contents do not necessarily reflect the views and policies of EPA or the Department, nor does the mention of trade names or commercial products constitute endorsement or recommendation for use.